

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

REC'D 23 MAR 2005

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Applicant's or agent's file reference DE9-2001-0083	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 03/50620	International filing date (day/month/year) 11.09.2003	Priority date (day/month/year) 18.10.2002
International Patent Classification (IPC) or both national classification and IPC G06F17/30		
Applicant INTERNATIONAL BUSINESS MACHINES CORPORATION et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 9 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 02.04.2004	Date of completion of this report 23.03.2005
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International application No. PCT/EP 03/50620

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-21 as originally filed

Claims, Numbers

1-17 as originally filed

Drawings, Sheets

1/11-11/11 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	4-6, 9-17
	No: Claims	1-3,7-8
Inventive step (IS)	Yes: Claims	
	No: Claims	1-17
Industrial applicability (IA)	Yes: Claims	
	No: Claims	1-17

2. Citations and explanations

see separate sheet

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Re. Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. The following document (D1) is referred to in this communication, the numbering will be adhered to in the rest of the procedure:

D1: US 2002/138460 A1 (COCHRANE ROBERTA JO ET AL) 26 September 2002 (2002-09-26)

2. The application does not meet the requirements of Article 6 PCT, because claims 1-17 are not clear for the following reasons:

2.1 When trying to interpret the above mentioned claims in the light of the description the following is noticed:

2.1a A "matrix presentation...of a database" is mentioned in claims 1-17 but this is not part of standard terminology. On page 5, paragraph 1 of the description a method and system is referred to for "matrix presentations or views of data" but it is not stated that matrix presentations are equivalent to views of data. No clear example is also provided in the description for a "matrix presentation... of a database".

2.1b For the purpose of search and examination, an interpretation of "matrix presentation...of a database" has been applied which is of a view of a database.

3. It also appears that claims 1, 15, 16 and 17 do not meet the requirements of Article 33(1) PCT, because the subject matter of claim 1 is not new in the sense of Article 33(2) PCT and the subject matter of claims 15, 16 and 17 is new in the sense of Article 33(2) PCT but not inventive in the sense of Article 33(3) PCT for the following reasons:

3.1 Document D1 discloses (references in parentheses applying to this document) the following features of claim 1:

- a computer-implemented method for generating an arbitrary n-dimensional matrix presentation of at least part of an m-dimensional database consisting of real data records

having at least one key dimension and at least one corresponding data value field (see abstract: the materialised view stored by the summary table is an example of a n-dimensional matrix presentation; for the generation of a materialised view which is a part of the method disclosed by D1 see paragraphs [0068], [0069], [0070], [0071]),

- said method comprising the steps of:

calculating a sorting sequence of the entries of said data value fields in accordance with said n-dimensional matrix presentation;

for each dimension of said n-dimensional matrix presentation, calculating corresponding entry point information into said sorting sequence (see paragraphs [0031], [0076]: the cube index is an example of a sorting sequence which can be implemented in a one-dimensional form such that indices are stored instead of values);

- calculating the cardinality of said n-dimensional matrix presentation, based on said calculated sorting sequence and said calculated entry point information;

generating said arbitrary n-dimensional matrix presentation, based on said calculated sorting sequence and said calculated entry point information (see paragraphs [0050], [0071], [0076]: it is implicit that the cube index is used to calculate the number of columns and rows of the materialised view stored by the summary table);

These are all the features of independent claim 1, thus the subject matter of claim 1 is not new.

3.2 It would be obvious to a person skilled in the art to implement the method of claim 1 as a data processing program, computer program product or online analytical processing system. The subject matter of claims 15, 16 and 17 is, therefore, new in the sense of Article 33(2) PCT but not inventive in the sense of Article 33(3) PCT.

4. Dependent claims 2-3, 7-8 do not meet the requirements of the PCT with respect to novelty (Article 33(2) PCT) and dependent claims 4-6 and 9-14 meet the requirements of the PCT with respect to novelty (Article 33(2) PCT) but not with respect to inventive step (Article 33(3) PCT) for the following reasons:

4.1 The additional features of claims 2-3 are disclosed in D1 (see paragraph [0098]).

4.2 The additional features of claims 7-8 are disclosed in D1 (see paragraphs [0119], [0121], [0124]: the use of GROUP BY in a query block is an example of an application of a

block element index).

4.3 The additional features of claims 13-14 are disclosed in D1 (see paragraph [0182]: a summary table is an example of a permutation table).

4.4 The additional features of claims 4-6, 9-12 would be obvious to a person skilled in the art of database manipulation and are not, therefore, inventive.

5. Independent of the above, the subject matter of claim 1 does not appear to be inventive in the sense of Article 33(3) PCT for the following reasons:

5.1 The subject matter of claim 1 includes the following features:

F1: a method for generating an arbitrary n-dimensional matrix presentation of at least part of an m-dimensional representation having at least one key dimension and at least one corresponding field

F1 describes a method for generating a matrix presentation: this is just a mapping of data in which a mathematical method operates on abstract data. F1 has, therefore, no technical character.

F2: said method comprising the steps of calculating a sorting sequence of the entries of said value filed in accordance with said n-dimensional matrix presentation.

F2 describes the calculating of a sorting sequence which is just an operation of rearranging data and thus has no technical character.

F3: for each dimension of said n-dimensional matrix presentation, calculating corresponding entry point information into said sorting sequence

F3 describes the calculation of entry point information which is just an operation of assigning a value and thus has no technical character.

F4: calculating the cardinality of said n-dimensional matrix presentation, based on said calculated sorting sequence and said calculated entry point information.

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F4 describes the calculation of the cardinality which is just an operation of performing a summation and thus has no technical character.

F5: generating said arbitrary n-dimensional matrix presentation, based on said calculated sorting sequence and said calculated entry point information.

F5 is just a combination of F1-F4 and thus has no technical character.

F1-F5 are, therefore, all mere acts of performing operation on data without any technical features enabling this to occur.

5.2 The subject matter of claim 1 is only technical in that it provides a computer-implemented method for implementing the features F1-F5 in a database. As it would be obvious to a person skilled in the art to implement the features F1-F5 in a database using a computer, the subject matter of claim is not inventive.

6. Similarly, the subject matter of dependent claims 2-14 does not appear to be inventive in the sense of Article 33(3) PCT for the following reasons:

6.1 The subject matter of dependent claims 2-14 includes the following features in addition to F1-F5:

F6: index values of one key dimension are represented by a vector.

F7: index values are represented by integer numbers.

F8: generating for each dimension, a reference table.. a sequence vector.. a count vector.

F9: sequence vector contains only integer numbers

F10: calculating of said entry point information is based on a first block element index and/or a last block element index

F11: mapping a first dimension onto a second dimension of said data records.

F12: reference table is based on a table which is extended by continuous index values.

F13: sequence vector consists of two columns.

F14: performing only integer-based vector calculations for generating matrix presentation.

F15: performing a pre-sorting step which provides a first block-wise sorting.

F16: index value resulting from said sorting steps is used in a sort position table.

F17: resulting permutation table represents a targeted matrix sequence.

F6-F17 just describe mathematical operations and thus have no technical character.

6.2 The subject matter of claims 2-14 is only technical in that it provides a computer-implemented method for implementing the features F6-F17 in relation to a database. As it would be obvious to a person skilled in the art to implement the features F6-F17 in a database using a computer, the subject matter of claims 2-14 is not inventive.

7. The subject matter of claims 15, 16, 17 has been formulated as functional steps intended to implement the method of claim 1: this subject is only technical in so far as it relates respectively to a data processing program, computer program product or online analytical processing system.

It would be obvious to a person skilled in the art to implement claim 1 in a data processing program, computer program product or online analytical processing system. As there are no additional technical features associated with claims 15, 16 and 17, the subject matter of claims 15, 16 and 17 is, therefore, not inventive.

8. It has not been demonstrated by the applicant that the method proposed is one which is guaranteed to reduce response time. The technical character of the proposed invention is thus unproven.

9. Even if the applicant establishes that the method is capable of reducing response time, this is not, in itself, sufficient to confer technical character. For any method, it is always

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possible to devise an associated method which will have a longer response time. The technical character of the proposed invention will, therefore, remain unproven.